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### PULMONARY FAT EMBOLISM DURING POSITIONING OF THE PATIENT

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#### ABSTRACT

Pulmonary fat embolism is one of the common complications associated with femur fracture. Though Fat embolism is more common during rimming of the intramedullary canal of fracture femur, it can also occur during positioning of the patient. Microvascular plugging of these fat droplets produce local ischaemia and releases inflammatory mediators and platelet aggregation. Here we present a case of 70 year old male patient who suffered from Pulmonary fat embolism after intertrochanteric nailing for intertrochanteric fracture. Patient was treated with ICU care and low molecular weight heparin

**KEYWORDS: KEYWORDS:** Intertrochanteric fracture, Fat Embolism, Low molecular weight Heparin

## INTRODUCTION

Pulmonary fat embolism presents with 3 cardinal symptoms: dyspnoea, confusion and petechiae. It is a rare clinical condition in which the embolized and circulating fat particles are deposited in the pulmonary capillary beds and brain tissue which leads to multisystem dysfunction in the skin, lungs, blood and brain. There are various procedures and causes of pulmonary fat embolism. Here we present a case report in which the pulmonary fat embolism occurred during positioning of the patient at the end of surgery when the patient was shifted from fracture table to the trolley. Timely recognition and immediate management resulted in recovery of the patient.

## CASE REPORT:

A 70 year old male patient was posted for intertrochanteric nailing for intertrochanteric fracture. The patient had no significant past history. All routine investigations and ECG were within normal limits. The patient was given

fitness preoperatively and was taken up for surgery. Intraoperatively patient was positioned on fracture table and was stable throughout surgery. There was minimal blood loss and surgery was uneventful.

After surgery patient was shifted from fracture table and was being shifted on trolley to the recovery room. The patient was accompanied by a resident. On the way, the patient was found to be unresponsive and cyanosed. The patient was shifted back to operation theatre. Monitor attached. SpO<sub>2</sub> was 60%. Patient was immediately intubated and ventilated. Also patient had bradycardia and feeble pulse. Patient was given intravenous atropine and simultaneously was given fluid resuscitation. The patient responded and became conscious. The patient started coughing and was conscious. The patient was extubated. The patient was not maintaining saturation but on supplementation with oxygen, patient had SpO<sub>2</sub> 100%. Patient still had some peripheral cyanosis, petechial

haemorrhages over chest but was conscious and oriented. The patient was shifted to postoperative surgical intensive care unit.

The patient was investigated. Apart from routine investigations, d-dimer was sent as pulmonary fat embolism was suspected which is most likely to occur in long bone fracture during surgery and during positioning of the patient. The d-dimer was raised ( Values more than 10,000 DDU ) and patient was started on subcutaneous low molecular weight heparin twice a day for 5 days. The patient improved and was shifted to ward for a week. Eventually, patient was discharged.

#### **DISCUSSION:**

Pulmonary fat embolism is a lethal complication associated with long bone fractures, with incidence of 0.9-2.2%. The patient may have pulmonary and neurological manifestations with petechial haemorrhages., Bergmann in 1873 first to

established the clinical diagnosis of fat embolism syndrome.

Pathogenesis of pulmonary fat embolism:

1. Mechanical- Mobilisation of fluid fat following trauma to bone and soft tissue.
2. Biochemical theory -indicates that inflammation due to trauma, in turn causes the bone marrow to discharge fatty acids, elevating levels of these, and inflammatory mediators, damage capillary beds. Fatty acids have demonstrated to cause inflammation within lungs.
3. Disseminated intravascular coagulation- might be involved in the process of pathogenesis of fat emboli.

**Criteria for the diagnosis of fat embolism syndrome according to Gurd and.Wilson<sup>(5,6)</sup>**

#### **Major.criteria**

- 1).Respiratory.insufficiency
- 2).Cerebral.involvement
- 3).Petechial.rash

#### **Minor.criteria**

- 1).Pyrexia (usually <39°C)
- 2).Tachycardia (>120 beats/min)

- 3).Retinal changes (fat or petechiae)
- 4).Jaundice
- 5).Renal changes (anuria or oliguria)
- 6).Anemia (a drop of more than 20% of the admission hemoglobin value)
- 7) Thrombocytopenia (a drop of >50% of the admission thrombocyte value)
- 8).High erythrocyte sedimentation rate (ESR>71mm/h)
- 9).Fat.macroglobulinemia

At least two major symptoms or signs or one major and four minor symptoms or signs must be present to diagnose the syndrome.

#### **Investigations:**

Laboratory tests are as follows:

1. CBC- Decreased hematocrit within 24-48 hrs. , thrombocytopenia.
2. Serum lipase raised
3. Serum Calcium reduced.
4. D-dimer levels- ( < or =250 ng/mL D-dimer units (DDU) < or =0.50 mcg/mL fibrinogen equivalent units: FEU) non specific but raised in pulmonary fat embolism.

5. Cytologic exam of urine, blood and sputum detects fat globules
6. Blood gases ( pO<sub>2</sub> less than 8 kPa (60 mm Hg))
7. CXR - evenly distributed, fleck-like pulmonary shadows (snow storm appearance), increased pulmonary markings and dilatation of the right side of the heart.
8. Transesophageal echo may detect fat emboli in heart.
9. CT chest and CT brain
10. Ventilation Perfusion scans.
11. ECG shows Sinus tachycardia, P pulmonale, Right axis deviation and ST-T changes of right ventricular strain.

#### **Management:**

Management of pulmonary embolism is largely supportive:

1. Maintenance of adequate oxygenation and ventilation.
2. Maintenance of haemodynamics by fluid resuscitation or inotropes.

3. Blood products administration
4. Anticoagulation - Prevention of deep vein thrombosis.
5. Methylprednisolone – helps to reduce inflammation
6. Albumin can eventually restore blood volume furthermore, it binds fatty acids, and may have the effect of decreasing the extent of any lung injury that has occurred.
7. Non surgical inferior vena caval obstruction using umbrella, balloon or filter devices attached to catheter tip.
8. Early immobilization of fracture site and Prompt surgical stabilisation of long bone fractures reduces the risk of the syndrome.

#### CONCLUSION:

Pulmonary fat embolism is a dreadful complication occurring usually following fracture of long bones. Only about 10% of cases result in catastrophic events. Early diagnosis , Early fixation of long bone fractures and effective anticoagulation help

in managing pulmonary fat embolism effectively.

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